

**Official Amendment**

Serial No. – 10/625,915

Docket No. – UVD 0280 IA / UD 268

REMARKS

Claims 1-10, 12-13, 37-49, 163, and 165-182 were pending. Claims 1, and 163 have been amended. Claims 41-42 are withdrawn. As a result of this amendment, claims 1-10, 12-13, 37-40, 43-49, 163, and 165-182 are currently under examination. Reexamination and reconsideration are requested in light of the accompanying amendments and remarks.

Applicants gratefully acknowledge the allowance of claims 165-182.

Applicants note that there are no rejections of claims 47-49, and respectfully request allowance of these claims.

The rejection of claims 1, 4-5, 8-9, 12-13, 37-40, and 163 under 33 U.S.C. § 102(b) as being anticipated by PCT publication WO 98/48075 (treated as equivalent to U.S. Patent No. 6,200,672 to Tadokoro) has been overcome.

Tadokoro teaches “a surface treated metal sheet which is coated with a layer comprising as main components, a *complex and/or salt* between a *rare earth metal element and an organic compound* having in the molecule one or more functional groups selected from among -O-, =O, -OH, -COOH, -NH<sub>2</sub>, -NH, =N-, -SH, -SO<sub>3</sub>H and phosphoric groups, and a *matrix which physically holds the above and has adhesive power for metal sheets*, as well as a metal surface treatment solution used therefore.” Abstract.

According to the Office Action, “Tadokoro teaches an aqueous metal surface treatment fluid comprising a rare earth element such as tetravalent cerium (col. 5 lines 6-9) and oxyacid anions such as phosphate, tungstate, vanadate anions, wherein the rare earth metal elements and the oxyacid anions form oxyacid compounds (col. 9 lines 28-33).”

However, col. 5, lines 6-9, and col. 9, lines 28-33 refer to different components of the coating. One component is a *complex and/or salt* between a rare earth element and an *organic compound* having certain functional groups (rare earth metal complex). The second component is a *matrix* capable of holding the rare earth metal complex and having adhesive power for metal sheets. See Abstract, col. 3, lines 12-20 and 61-67, col. 13, lines 43-55, and Tables 1 and 2. The

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discussion at col. 5, lines 6-9 refers to the first component, the rare earth metal complex. See col. 4, line 52 to col. 5, line 35, and col. 10, line 64 to col. 11, line 48. The discussion at col. 9, lines 28-33 refers to the second component, the matrix. See col. 7, lines 46-60, col. 9, lines 26-43, col. 10, lines 4-8, col. 12, line 43 to col. 13, line 42.

The Office Action also stated that “Tadokoro further teaches a rare earth metal complex comprising rare earth elements such as tetravalent cerium and an inorganic compounds [sic] such as phosphates, nitrates and sulfates (col. 5 lines 27-31).” However, col. 5, lines 27-31 does not refer to a complex between a rare earth metal and an inorganic compound. As explained at col. 5, lines 24-27, the rare earth metal complex (i.e., the complex and/or salt between a rare earth element and an organic compound) can have an inorganic compound as a ligand. “In the case of a complex, there is no problem if it *also contains an inorganic compound as a ligand in addition to the organic compound.*” Tadokoro’s complex or salt is between a rare earth element and an *organic* compound. See Abstract; col. 2, lines 38-46, 52-61; col. 2, lines 12-20, 33-39, and 61-67; col. 4, lines 13-20; col. 5, lines 10-31; col. 6, line 40 to col. 7, line 13.

Although Tadokoro mentions the use of tetravalent cerium, it does not teach that “at least one rare earth element is in the tetravalent oxidation state in the rare earth/valence stabilizer complex in the solid corrosion-inhibiting conversion coating,” as in claims 1, and 163. The fact that tetravalent cerium is present in the starting solution, as shown in the Examples and Tables 1 and 2, does not mean it is present in the complex in the pigment composition. Tetravalent cerium compounds in solution can easily form trivalent compounds in formed films or react to form other compounds. The anticorrosion performance of coatings that contain complexes of trivalent rare earths and of tetravalent rare earths is notably different. With complexes containing trivalent rare earths, the formed coating is simply a barrier film which prevents corrosive species from reaching the metal.

Tadokoro teaches that the valency of the rare earth metals does not matter.

Rare earth metal elements have anti-corrosion functions, although the mechanism thereof is not clear. *Any rare earth metal element* may be used in the rare earth metal

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complex (i.e. the complex and/or salt of the organic compound and rare earth element) used for the invention, and *there are no particular restrictions on the valency of the rare earth metal at the time the rare earth metal complex is formed*. Lanthanoids and/or yttrium are preferred from the standpoint of ease of handling, while from an economical standpoint, lanthanum or cerium is preferred, and tetravalent cerium which also has oxidizing power is even more preferred.

Col. 4, line 65 to col. 5, line 9.

Furthermore, the action of the organic species in Tadokoro is different from that of the claimed invention.

Since such an organic compound adheres to metal surfaces, it can effectively supply the rare earth metal to the metal sheet surface and, even after dissociating from the rare earth metal element in the layer when corrosion proceeds, *it forms a complex with the dissolved metal component of the metal sheet and precipitates*, thus inhibiting further ionization of the metal sheet.

Col. 6, lines 51-59. Thus, the organic species in Tadokoro are introduced such that *they bind with the metal ions supplied by the corroding metal itself*. In contrast, the valence stabilizers of the present invention are introduced to form stable tetravalent rare earth species in the *formed coating*.

Moreover, Tadokoro is a non-enabling reference which does not anticipate the claimed invention. “[A] § 102(b) reference must sufficiently describe the claimed invention to have placed the public in possession of it. . . . [E]ven if the claimed invention is disclosed in a printed publication, that disclosure will not suffice as prior art if it was not enabling. . . .” *Paperless Accounting, Inc. v. Bay Area Rapid Transit System*, 804 F.2d 659, 665, 231 USPQ 649, 653 (Fed. Cir. 1986); See also, *Akzo N.V. v. U.S.I.T.C.*, 808 F.2d 1471, 1479, 1 USPQ2d 1241, 1245 (Fed. Cir. 1986). Although patents are presumed to be enabling, the presumption can be rebutted. MPEP 2121.02.

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Applicants repeated Tadokoro's experiments with catechol, dextrose (as a close surrogate for  $\gamma$ -cyclodextrin), and 2-hydroxynicotinic acid which were said in Tadokoro to produce tetravalent rare earth metal complexes, as well as with salicylic acid which is slightly less soluble than 2-hydroxynicotinic acid. Following Tadokoro's process, catechol yielded a precipitate which did not contain either tetravalent cerium or trivalent cerium. 2-hydroxynicotinic acid and salicylic acid produced precipitates containing cerium III. Dextrose did not produce any precipitate, indicating that this complex is highly water soluble. As a result, it does not meet the solubility requirements of the claims and is unsuitable for use in a pigment composition. None of the reactions produced a cerium IV complex. See Paragraphs 3-10 of the Declaration of Jeffrey A. Sturgill.

Thus, Tadokoro is a non-enabling reference and it would take undue experimentation to produce a tetravalent cerium complex using Tadokoro's disclosure. Therefore, Tadokoro does not anticipate the claimed invention.

With respect to claims 1 and 11-13, the Office Action stated that "the tetravalent cerium of Tadokoro reads on the claimed rare earth element and the phosphate, tungstate, vanadate, sulfate and nitrate of Tadokoro read on the claimed inorganic valence stabilizer. The oxyacid compound or the rare earth metal complex of Tadokoro reads on the rare earth/valence stabilizer." As discussed above, Tadokoro's teaches a complex or salt between a rare earth metal and an *organic* compound. Tadokoro does not teach a "a rare earth element and an inorganic valence stabilizer combined to form a rare earth/valence stabilizer complex," as claimed.

According to the Office Action, "[w]ith respect to the amended feature of a solid conversion coating formed on a metal substrate as a result of applying the coating composition of Tadokoro is a solid conversion coating layer as claimed." However, Tadokoro does not teach a conversion coating. A conversion coating is formed during intentional exposure of metal to a chemically reactive solution. The metal is exposed to a compound that chemically alters the surface and forms a coating that provides a high degree of corrosion resistance. The protective

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film is produced by a chemical redox reaction between the metal surface and the conversion coating solution. See p. 2, line 15 to p. 3, line 16.

Tadokoro teaches applying a layer comprising as major components a rare earth metal complex, and a matrix. The matrix “*physically* holds the above [rare earth metal complex] and *has adhesive power* for metal sheets.” Abstract. “The layer matrix used for the invention is not particularly restricted so long as it is a material which does not notably impair the stability of the rare earth metal complex, and *which physically holds* the rare earth metal complex in the layer on the metal surface and attaches to the metal sheet.” Col. 7, lines 45-49.

Tadokoro’s bath is prepared by combining the rare earth metal complex and layer matrix. Col. 13, lines 44-55. The treatment baths were coated onto a steel sheet using a bar coater and dried. Col. 15, lines 35-53. The layer contains the complex and/or salt of an organic compound and rare earth metal element in a matrix, as shown in Fig. 1, Item 3. Tadokoro’s matrix holds the rare earth metal complex, but neither the rare earth metal complex nor the matrix reacts with the surface to form the layer. It is simply a layer deposited on the metal surface. Nowhere does Tadokoro teach that the matrix or the rare earth metal complex react with the surface of the metal during deposition.

According to the Office Action “applicant’s argument [is not] persuasive since Tadokoro’s coating composition . . . are substantially the same as the claimed coating composition, therefore, one of ordinary skill in the art would have expected them to also react with the metal surface to produce a conversion coating. Tadokoro’s coating composition comprises organic and inorganic phosphoric acid compounds containing phosphate, which would have caused at least some reaction with the underlying metal surface. Therefore, the solid coating as taught by Tadokoro reads on a conversion coating based on the broadest reasonable interpretation. In addition, the teaching of Tadokoro’s that the layer matrix physically holds the rare earth metal complex in the layer on the metal surface and attaches to the metal sheet only directed [sic] to the adhesion of the coating of Tadokoro and the metal substrate and does not directly implying [sic] no chemical reaction between the coating and the metal substrate.”

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First, Tadokoro's coating composition is not substantially the same as applicants' conversion coating. Tadokoro teaches a matrix material which physically holds a rare earth complex or salt. Such a composition is not the same or substantially the same as a conversion coating which reacts with the metal surface.

In addition, this ignores the teaching of Tadokoro. As discussed above, Tadokoro teaches that the matrix *physically holds* the rare earth metal complex or salt. Nowhere does Tadokoro teach or suggest that either the matrix or the rare earth metal complex reacts with the metal surface during deposition.

Moreover, the mere fact that an organic or inorganic phosphoric acid compound is present does not mean that the compound will react with metal. For example, tributyl phosphate, a plasticizer for cellulose esters, lacquers, and plastics, does not react with metals (Merck Index). Many long-chain alkyl phosphate esters are used in lubricants with little or no chemical interaction with metals. Likewise, many inorganic phosphates do not interact with metals. For example, tricalcium phosphate is a material used for dental and medical implants that does not interact with metals.

The office action further states “[i]f applicant questions the ability of coating composition [sic] of Tadokoro . . . to produce a conversion coating, the applicant is invited to provide factual evidence data showing that there are no chemical reactions taking place when applying the compositions of Tadokoro . . . to the metal substrate.” However, the applicants have no duty to provide any such evidence in light of the clear teaching of Tadokoro that the matrix merely physically holds the rare earth complex or salt. The examiner is not free to ignore this clear teaching of Tadokoro.

Therefore, Tadokoro does not teach a conversion coating as claimed.

As to claim 8, the Office Action stated that “Tadokoro further teaches the coated metal surface can be further covered by an over coat layer (col. 10, lines 35-38). Since Tadokoro teaches the same rare earth/valence stabilizer complex as claimed in its coating fluid, the coating solution of Tadokoro inherently has the same adhesion enhancing morphology as claimed.” As

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discussed above, Tadokoro does not teach a conversion coating, but rather a layer of a matrix containing a rare earth metal complex and/or salt which is coated on the metal surface. Such a surface coating does not inherently have the morphology of any type of conversion coating.

With respect to claim 9, the Office Action stated that “since the oxyacid compound of Tadokoro reads on the claimed rare earth/valence stabilizer, the examiner asserts that the rare earth/valence stabilizer as taught by Tadokoro inherently has a central cavity containing cerium as claimed. In addition, since specifics of the additional ions are not recited in the claim, any ions, such as impurities in the cavity of the rare earth metal complex, can read on the claimed additional ion.”

As discussed on p. 170, lines 1-19, in the case of the heteropolymetallates, there is a central cavity which can contain an ion in addition to cerium. Examples include silicomolybdates, phosphomolybdates, silicotungstates, and phosphotungstates. In these complexes, the central cavity contains a  $\text{Si}^{+4}$  or  $\text{P}^{+5}$  ion in addition to the cerium ion. The molybdenum or tungsten is not in the central cavity; rather, it forms the central cavity. Thus, in a cerium/vanadate complex as described in Tadokoro, the vanadium ion is not in the central cavity.

As to the statement that impurities in the cavity of the rare earth complex can read on the additional ion, the Office Action provides no support for the assertion that impurities in the rare earth metal complex would or could be located in the central cavity as described in the specification. Applicants request that the examiner provide evidence to support this assertion.

With respect to claims 37-40, the Office Action stated that “Tadokoro teaches the presence of cerium ions which read on the claimed cationic solubility control agent. Tadokoro further teaches the presence of calcium, zinc, lanthanum, hydrogen, zirconium, and titanium ions (col. 10, lines 9-18) which also read on the claimed cationic solubility control agent.”

Tadokoro does not teach that “the rare earth/valence stabilizer complex further comprises a solubility control agent,” as claimed. As discussed at p. 338, line 5 to p. 344, line 8, one of the roles of the valence stabilizer is to allow for formation of a tetravalent cerium, praseodymium, or terbium complex that has a specific solubility range. The anions or cations present in the coating

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solution may be sufficient to form a  $\text{Ce}^{+4}$ ,  $\text{Pr}^{+4}$ , or  $\text{Tb}^{+4}$ -containing compound within the conversion coating that exhibits the desired solubility characteristics. Additional solubility control may be desirable to optimize the performance of the tetravalent cerium-, praseodymium-, or terbium-valence stabilizer complex. The initial formation of the conversion coating may produce  $\text{Ce}^{+4}$ ,  $\text{Pr}^{+4}$ , or  $\text{Tb}^{+4}$  compounds with solubilities greater than optimal. Additional solubility control agents applied to a workpiece can enhance the  $\text{Ce}^{+4}$ ,  $\text{Pr}^{+4}$ , or  $\text{Tb}^{+4}$  content of the coating by forming more insoluble compounds in place. Additional solubility control agents are typically applied as a second solution.

Tadokoro teaches that the layer and the treatment solution can include some additional materials.

There may also be added to the layer and treatment solution of the invention phosphoric acid or polyphosphoric acid as *passivation layer-forming aids*, or calcium hydroxide, calcium carbonate, calcium oxide, zinc phosphate, potassium phosphate, calcium phosphate, lanthanum phosphate, lanthanum hydrogen phosphate, cerium phosphate, cerium hydrogen phosphate, calcium silicate, zirconium silicate, aluminum phosphate, zirconium phosphate,  $\text{TiO}_2$ ,  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{La}_2\text{O}_3$ ,  $\text{CeO}_2$ , etc. as *additional additives*.

Col. 10, lines 10-18. Tadokoro teaches the use of certain compounds as passivation layer-forming aids, and others as additional additives in its layer. Tadokoro's compounds are not solubility control agents. They do not alter the solubility of the cerium-, praseodymium-, or terbium-valence stabilizer complex. They are simply additional components in the layer.

According to the Office Action, "applicant's argument [is not] persuasive since Tadokoro teaches the claimed cerium, calcium, zinc, lanthanum, hydrogen, zirconium and titanium ions present in its coating composition . . . . Therefore, these ions would inherently function as a solubility control agent to the same degree in the prior art as in the claimed invention."

However, the additional compounds included in Tadokoro's composition do not form part of the rare earth/valence stabilizer complex, as claimed.



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Therefore, claims 1, 4-5, 8-9, 12-13, 37-40, and 163 are not anticipated by Tadokoro.

The rejection of claims 1, 4-5, 8-9, 12-13, 37-40, 43-45, and 163 under 33 U.S.C. § 102(b) as being anticipated by DePue (U.S. Patent No. 5,322,560) is respectfully traversed. DePue teaches a corrosion inhibitor compound for treating aluminum flake pigment. The corrosion inhibitor compound is the reaction product of a water-soluble metal salt including metals selected from the group consisting of yttrium and rare earth metals and an anionic metal salt including transition metal oxo-complexes and soluble salts of silicon and mixtures thereof. Abstract.

According to the Office Action, DePue teaches that the “corrosion inhibitor compound comprises a rare earth metal such as tetravalent cerium (col. 2 lines 55-60), a silicon salt and a metal oxo-complexes [sic] of Ti, V, Cr, Zr, Nb, Mo, Hf, Ta, and W (col. 2 lines 27-36, col. 3 lines 17-22).”

The corrosion inhibitor of DePue is described at col. 2, lines 27-36, and col. 3, lines 17-22. However, the compounds described at col. 2, lines 55-59 are different compounds (*water-soluble*) which can be used as *primary corrosion inhibitors* in combination with DePue’s claimed corrosion inhibitor (which is *slightly soluble*) which would be a *secondary corrosion inhibitor*.

The corrosion inhibitors of the present invention are also useful when *used in combination with water-soluble metal salts of yttrium and the rare earth metals*.

*Particularly useful salts include trivalent cerium, yttrium and lanthanum salts and tetravalent cerium salts.*

These salts are discussed further at col. 4, lines 34-55.

The slightly soluble corrosion inhibitor of the present invention is also useful in aqueous coating compositions containing aluminum flake pigment. The corrosion inhibitor is particularly effective in coating compositions when used as a secondary corrosion inhibitor in combination with *a primary corrosion inhibitor which is a water-soluble salt of trivalent or tetravalent salt of cerium, yttrium or lanthanum*. Water-

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soluble salts useful as a primary corrosion inhibitor compound for treating the aluminum pigment include cerium sulfate, cerium triacetate, cerium isopropoxide, ammonium cerium nitrate, yttrium triacetate, lanthanum triacetate and cerium nitrate.

When used in combination in a coating composition, *the water soluble metal salt used as the primary corrosion inhibitor* is present in an amount of between 0.01% and 5.0% by weight based on total pigment weight and *the slightly soluble salt used as the secondary corrosion inhibitor* is used in an amount between 0.01% and 5.0% by weight based on the combined weight of the corrosion inhibitor and pigment.

Thus, the only *tetravalent* rare earth compounds described in DePue are *salts*, not *rare earth/valence stabilizer complexes*, as claimed. These salts are highly soluble in water, and fall above the solubility parameters specified in the claims. In fact, several of the salts mentioned are identified in the application as being suitable cerium sources: cerium sulfate, cerium triacetate, ammonium cerium nitrate and cerium nitrate. See p. 345, line 15 to p. 346, line 2, and Table 3.

The Office Action stated that “Applicant further argues that DePue teaches a soluble rare earth metal salt, not a rare earth metal complex as claimed.” However, this misstates Applicants’ argument. DePue’s claimed corrosion inhibitor is a *slightly soluble compound* which is the reaction product of a water soluble compound of yttrium or a rare earth metal and an anionic metal complex including soluble salts of transition metal oxo-complexes, soluble silicates, and mixtures thereof. DePue teaches that this *slightly soluble corrosion inhibitor* can be used as a secondary corrosion inhibitor in combination with a primary corrosion inhibitor which is a *water-soluble metal salt* of yttrium and rare earth metals. Col. 2, lines 8-36, and 56-60; and col. 4, lines 32-44, and col. 4, line 45 to col. 5, line 9. DePue’s *slightly soluble corrosion inhibitor* does not include “at least one rare earth element [] in the tetravalent oxidation state in the rare earth/valence stabilizer complex in the solid corrosion-inhibiting conversion coating,” as claimed. The only discussion of a *tetravalent* cerium compound is in connection with the *water-soluble metal salts* of yttrium and the rare earth metals, as discussed at col. 2, lines 56-60; and col. 4, lines 32-44.

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The Office Action also stated that “applicant’s argument [is not] persuasive since DePue teaches a slightly water soluble corrosion inhibitor compound which is a product of a rare earth metal salt, a metal oxo-complex and a silicon salt. The rejection ground is based on this slightly water soluble corrosion inhibitor compound in an aqueous solution as taught by DePue, which reads on the claimed rare earth/valence stabilizer complex.” However, DePue’s *slightly soluble corrosion inhibitor* does not contain *tetravalent* rare earth metals. Nowhere in the description of the slightly soluble corrosion inhibitor is there any mention of a product in which the rare earth is in the tetravalent state or of any process which would be required to make such a compound. Quite the contrary, DePue teaches the use of trivalent cerium compounds in Examples 1 (cerous metavanadate), 2 (cerous silicate), 4 (cerous metavanadate), 7 (cerous molybdate and cerium triacetate (trivalent cerium)), and 8 (cerous tungstate). None of DePue’s examples involve the use of a tetravalent cerium complex. The only description of a compound with cerium in the *tetravalent state* is with respect to the *water-soluble salt*, not the *slightly soluble corrosion inhibitor* (col. 2, lines 56-60; and col. 4, line 34-39).

Moreover, Applicants repeated DePue’s experiments with cerium (III) nitrate, cerium (IV) ammonium nitrate, and cerium (III) sulfate with sodium molybdate, sodium tungstate, sodium metasilicate, and sodium metavanadate. In every case except for the use of sodium metavanadate, the process described in DePue produced compounds having trivalent cerium, not tetravalent cerium, as claimed. With respect to the product made using sodium metavanadate, it was not possible to determine whether the species was tetravalent cerium or vanadium +5 in the vanadate using the test that was run. See Paragraphs 11-19 of the Declaration of Jeffrey A. Sturgill. However, DePue itself teaches that the compound formed was trivalent cerium. See Example 1. Thus, Applicants’ experiments confirm DePue’s teaching that trivalent compounds are formed.

DePue’s corrosion inhibitor compounds do not contain tetravalent cerium. Aluminum flake pigment treated with the corrosion inhibitor compound is said to inhibit corrosion of the pigment particles in water-borne coating compositions. See col. 1, lines 54-66, and col. 2, lines

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8-12. The corrosion inhibitors are formed by reacting the water-soluble metal salt of yttrium, or rare earth metals with a transition metal oxo-complex or a silicate salt in aqueous solution. The resultant reaction product is then filtered and oven dried. See col. 3, lines 23-29. The aluminum flake pigment particles are treated with the corrosion inhibitor by forming a slurry of the aluminum pigment and a corrosion inhibitor and water. The pigment remains in mixture with the solution for 0.5 to 4 hrs to form the protective coating of the corrosion inhibitor on the aluminum flake pigment. The contact time must be adequate for formation of a rare earth metal or transition metal oxide coating on the aluminum flake pigment. See col. 2, lines 37-45, and col. 3, lines 35-62, and Examples. Because there is no tetravalent cerium in the rare earth metal oxocompound, and there is nothing in the solution/slurry which could oxidize the cerium, there is no tetravalent cerium in the oxide coating.

In addition, DePue's corrosion inhibitor is a precipitate, not a conversion coat, as claimed.

Most of the time release *corrosion inhibitor remains unreacted* in the form of a *precipitate*, due to its relatively insoluble nature.

It is hypothesized that the *precipitate* of the relatively water-insoluble corrosion inhibitor of the present invention provides an additional source of rare earth metal, yttrium or transition metal to form a metal oxide protective coating at any site on the pigment unprotected by the metal oxide film provided by the more soluble trivalent and tetravalent salts of the cerium, yttrium and lanthanum.

Col. 4, lines 56- to col. 5, line 9.

As discussed above, conversion coatings are formed during intentional exposure of metal to a chemically reactive solution. The metal is exposed to a compound that chemically alters the surface and forms a coating that provides a high degree of corrosion resistance. The protective film is produced by a chemical redox reaction between the metal surface and the conversion coating solution. See p. 2, line 15 to p. 3, line 16. In DePue, when a site becomes unprotected by the metal oxide film provided by the more soluble trivalent and tetravalent salts of cerium,

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yttrium and lanthanum, the corrosion inhibitor precipitate acts as a source of rare earth, yttrium, or transition metal to form a metal oxide protective coating on the pigment. Col. 4, line 56 to col. 5, line 9. DePue's corrosion inhibitors are precipitates which simply sit on the surface of the metal when formed. Thus, DePue's corrosion inhibitors are not conversion coats, as claimed.

The Office Action states "[w]ith respect to the claim feature of a solid conversion coating formed on a metal substrate, the coating layer formed on the metal substrate as a result of applying the coating composition of DePue is a solid conversion coating layer as claimed." However, as discussed above, DePue's corrosion inhibitor is a precipitate which does not react with the surface of the metal when formed. Thus, it is not a conversion coating, as claimed.

The Office Action also stated that "applicant's argument [is not] persuasive since . . . the water soluble salt in the coating composition of DePue would also have caused, at least some reaction with the underlying metal surface. Therefore, the solid coating as taught by DePue reads on the claimed conversion coating based on the broadest reasonable interpretation." However, the Office Action stated that the rejection was "based on this *slightly soluble corrosion inhibitor*," not the *water soluble salt*. As discussed above, the slightly soluble corrosion inhibitor is a precipitate which does not react with the surface when formed. The examiner is not free to ignore DuPue's clear teaching.

As to claim 8, the Office Action stated that "DuPue further teaches the coated metal surface can be further covered by a clear coat over coat layer (col. 6, lines 61-63). Since DePue teaches the same rare earth/valence stabilizer complex as claimed in its coating fluid, the coating solution of Tadokoro [sic] inherently has the same adhesion enhancing morphology as claimed." As discussed above, DePue does not teach a conversion coating, but rather a coating containing treated aluminum flake particles, such as a base coat for a color-plus-clear composite coating. Such a surface coating does not inherently have the morphology of any type of conversion coating.

With respect to claim 9, the Office Action stated that "since DePue teaches the claimed rare earth/valence stabilizer complex, it also inherently teaches the central cavity containing

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cerium as recited in instant claim 9. In addition, since specifics of the additional ions are not recited in the claim and there are always impurity ions randomly distributed in the coating solution including the cavity of the rare earth metal complex, any ions, such as impurities, in the cavity of the rare earth metal complex, can read on the claimed additional ion.”

As discussed on p. 170, lines 1-19, in the case of the heteropolymetallates, there is a central cavity which can contain an ion in addition to cerium. Examples include silicomolybdates, phosphomolybdates, silicotungstates, and phosphotungstates. In these complexes, the central cavity contains a  $\text{Si}^{+4}$  or  $\text{P}^{+5}$  ion in addition to the cerium ion.

As to the statement that impurities in the cavity of the rare earth complex can read on the additional ion, the Office Action provides no support for the assertion that impurities in the rare earth metal complex would or could be located in the central cavity. Applicants respectfully request that the examiner provide a factual basis for this assertion.

With respect to claims 37-40, DePue does not teach the use of solubility control agents as claimed. As discussed above, one of the roles of the valence stabilizer is to allow for formation of a tetravalent cerium, praseodymium, or terbium complex that has a specific solubility range. The anions or cations present in the coating solution may be sufficient to form a  $\text{Ce}^{+4}$ ,  $\text{Pr}^{+4}$ , or  $\text{Tb}^{+4}$ -containing compound within the conversion coating that exhibits the desired solubility characteristics. Additional solubility control may be desirable to optimize the performance of the tetravalent cerium-, praseodymium-, or terbium-valence stabilizer complex. The initial formation of the conversion coating may produce  $\text{Ce}^{+4}$ ,  $\text{Pr}^{+4}$ , or  $\text{Tb}^{+4}$  compounds with solubilities greater than optimal. Additional solubility control agents applied to a workpiece can enhance the  $\text{Ce}^{+4}$ ,  $\text{Pr}^{+4}$ , or  $\text{Tb}^{+4}$  content of the coating by forming more insoluble compounds in place. Additional solubility control agents are typically applied as a second solution.

The Office Action stated that “DePue further teaches the presence of Na ions from the metal oxo-complexes (col. 3 lines 17-22), which reads on the cationic solubility control agent as claimed. In addition, the Ce, Ti, Zr, V, Cr, W, Mo, Nb, Hf, Ta as taught by DePue also read on the claimed cationic solubility control agent (col. 2, lines 27-36, col. 3, lines 17-22).”

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Col. 2, lines 27-36 describes particularly useful corrosion inhibitors as including the reaction product of water-soluble compounds including yttrium, lanthanum, or rare earth metals of the lanthanum series and an anionic metal complex including a soluble salt of silicon or of a transition metal oxo-complex where the transition metal is selected from titanium, vanadium, chromium, zirconium, niobium, molybdenum, hafnium, tantalum, and tungsten transition metals as transition metals for transition metal oxo-complexes. Col. 3, lines 17-22 lists preferred water-soluble salts of transition metal oxo-complexes. The claimed corrosion inhibitor is the reaction product of these two compounds. As a result, the Ti, Zr, V, Cr, W, Mo, Nb, Hf, Ta form the corrosion inhibitor compound and would not be available for use as solubility control agents. Applicants also note the recitation of cerium nitrate as the preferred water-soluble metal salt for reaction with the anionic metal salt. Thus, the cerium reacts with the metal salt and would not be available for use as a solubility control agent.

With respect to claims 44-45, the Office Action cited col. 6, lines 12-28 as showing “a color brightener . . . which read [sic] on the agent for improving color fastness.” However, DePue does not teach a color brightener.

It may be desirable to include small amounts of *rheology control agents*, for example fumed silicas, hectorite clays, bentonite clays, or cellulose acetate butyrate. Such materials are usually used at levels of less than 10% based on the total solid weight of reactants. *Rheology control agents are used to control the flow and leveling of the composition during application and curing steps. The rheology control agent is also for controlling the metallic appearance of the coating.* Such materials may help “fix” the pigment flake surface in an alignment parallel to the surface of the coating to maximize the brightness when viewed head-on and to maximize the darkness when viewed obliquely.

DePue teaches the use of rheology control agents which control the flow of the material during application and curing. They can also help to align the aluminum pigment flake surface parallel

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to the surface of the coating. However, this alignment does not improve color-fastness of the coating.

The Office Action stated that “[t]he rheology control agent as taught by DePue controls the metallic appearance of the coating and maximizes the brightness and the darkness of the coating by fixing the pigment flake surface in an alignment parallel to the surface. Therefore, the rheology control agent as taught by DePue ultimately enhances the color of the coating, which leads the examiner to conclude that the rheology control agent is a color brightener that would read on the claimed agent for color fastness.”

Even assuming that the rheology control agents in some way enhance the color of the coating, that does not mean they are an “agent which improves color-fastness of the conversion coating” as claimed. As discussed at p. 344, lines 10-20, long-term exposure to high energy wavelengths (i.e., the ultraviolet wavelengths of sunlight) may fade or dim the color of the coated work piece. The rheology control agents of DePue do not do anything to prevent the color from fading. They can control the metallic appearance of the coating, and help to align the aluminum flake parallel to the surface, which helps to maximize the brightness when viewed head-on and maximize the darkness when viewed obliquely. Neither has anything to do with preventing the color from fading.

Thus, DePue does not teach “an agent which improves color-fastness of the conversion coating,” as claimed.

Therefore, claims 1, 4-5, 8-9, 12-13, 37-40, 43-45, and 163 are not anticipated by DePue.

The rejection of claims 2-3, and 6-7 under 33 U.S.C. § 103(a) as being unpatentable over Tadokoro is respectfully traversed. Tadokoro does not teach or suggest the limitations of claim 1, as discussed above. Therefore, claims 2-3, and 6-7 would not have been obvious to one of skill in the art at the time the invention was made over Tadokoro.

The rejection of claims 43-46 under 33 U.S.C. § 103(a) as being unpatentable over Tadokoro in view of Dattilo (U.S. Patent No. 6,291,018) is respectfully traversed. Dattilo is cited as teaching “a metal surface treatment coating composition comprising color pigments such



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as carbon black and phthalocyanines.” However, Dattilo does not remedy the deficiencies of Tadokoro. Therefore, claims 43-46 would not have been obvious to one of skill in the art at the time the invention was made over Tadokoro in view of Dattilo.

The rejection of claims 2-3, and 6 under 33 U.S.C. § 103(a) as being unpatentable over DePue is respectfully traversed. DePue does not teach or suggest the limitations of claim 1, as discussed above. Therefore, claims 2-3, and 6 would not have been obvious to one of skill in the art at the time the invention was made over DePue.

The rejection of claim 46 under 33 U.S.C. § 103(a) as being unpatentable over DePue in view of Dattilo is respectfully traversed. Dattilo is cited as teaching “a metal surface treatment coating composition comprising color pigments such as carbon black and phthalocyanines.” However, Dattilo does not remedy the deficiencies of DePue. Therefore, claim 46 would not have been obvious to one of skill in the art at the time the invention was made over DePue in view of Dattilo.

Applicants gratefully acknowledge the statement that claim 10 would be allowable if rewritten in independent form. Claim 10 was previously rewritten as independent claim 165.

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CONCLUSION

Applicants respectfully submit that, in view of the above amendment and remarks, the application is now in condition for allowance. Applicants respectfully request that claims 1-10, 12-13, 37-40, 43-46, 163, and 165-182 be passed to allowance.

In any event, applicants request entry of the amendment because it reduces the number of claims and presents the claims in better form for appeal.

If the Examiner has any questions or comments regarding the present application, she is invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,  
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